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COMPUTATION OF TIME, AND CHANGES OF STYLE IN THE CALENDAR.

ADDRESSED TO STUDENTS OF HISTORY AND GENEALOGY.

BY SPENCER BONSALL.

Julian and Gregorian Calendar.

More than one hundred and twenty-five years have elapsed since the British Government ordained that a change should be made in the calendar, in order to prevent further errors in the chronological record of events, by the adoption of the Gregorian, or "New Style," of computing the length of the year, in place of the Julian, or "Old Style," then in use. This law applied to the American and all other colonies of the English Crown; yet there are but few persons, at the present time, who have a clear conception of the meaning of the above terms; and, as the subject has seldom been treated, in the works of reference commonly used, in the manner it deserves, mistakes are frequently made, even by literary men, when writing of past events.

It is unnecessary to enter into an examination of the various calendars that have been in vogue from time immemorial; therefore, I will confine myself to the two now in use by Christian nations.

The solar or tropical year is that period which corresponds to the sun's revolution in the ecliptic from any equinox or solstice to the same again. If the civil year corresponds with the solar, the seasons of the year will always occur at the same period. But prior to the Christian era, the Roman pontiffs, from self-interested motives, added to or took from the year capriciously, so as to lengthen or shorten the period during which a magistrate remained in office, and by this means created such irregularity, that in the days of Julius Cæsar the spring season occurred in what the calendar called summer.

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According to Censorinus, quoted by Dr. Smith in his Dictionary of Greek and Roman Antiquities, the confusion was at last carried so far that Caius Julius Cæsar, the Pontifex Maximus, in his third Consulate, with Lepidus for his colleague, inserted between the months of November and December two intercalary months, consisting, together, of 67 days, and to the month of February an intercalation of 23 days, which, added to the length of the previous year, 355 days, made the whole of *that* year 445 days, thus bringing the calendar to conform with the seasons. This year was called by Macrobius "the last year of confusion."

Cæsar now undertook the formation of a new calendar. With the assistance of Sosigenes, a famous Egyptian mathematician, he calculated the solar year, which he fixed at 365 days and 6 hours; and, to make allowance for the hours, he determined on the intercalation of one day in every four years, which, being a duplication of the 6th, before the Calends of March, was called the *Bissextile*, or *twice sixth.* That is, the day answering to the 24th of February was counted twice, both days having the same name, which also gives us our term of leap-year, which leaps over, as it were, one day more than there are days in a common year.

This was the Julian method of computing time, the reckoning by which commenced in the 45th year B. C., and introduced our present arrangement of having three years of 365 days, followed by one of 366, dividing the year into months nearly as at present.

In A. D. 325, the first Ecumenical or General Council assembled at Nice, in Asia Minor, to deliberate and act on ecclesiastical matters. They composed the *Nicene Creed*, etc. etc., and fixed the days on which Easter and other movable feasts should be celebrated. At that date, the Vernal Equinox, the precise time when the days and nights are equal, fell on the 21st of March, although in the time of Julius Cæsar that event happened on the 25th. Not knowing that the error was in the calendar, but supposing the former date to be correct, and that there would be no variation from it, the Council decreed that Easter day should be "the first

Sunday after the first full moon which happened next after the 21st of March. And if the full moon happens upon a Sunday, Easter day is the Sunday after." This rule is still in force.

The calendar of Julius Cæsar was found to be defective, for in the year 1582, the vernal equinox fell on the 11th, instead of the 21st of March. Pope Gregory XIII, assisted by several learned men, made a complete reformation of it. The Encyclopædia Britannica gives the name of the author of the system adopted as Aloysius Lilius, or Luigi Lilio Ghiraldi, a learned astronomer and physician of Naples.

The solar or tropical year is found by observation to consist of 365 days, 5 hours, 48 minutes, and 46.14912[1] seconds, which not being equal to the year of 365 days, 6 hours, upon which Julius Cæsar established the leap-year (the difference, 11 minutes, 14 seconds, amounting in about 128 years to a whole day), Gregory, assuming his fixed point of departure, not A. D. 1, but the year of the Council of Nice, A. D. 325, decreed that *that* year, 1582, should consist of 355 days only (October 5th became October 15th), thus dropping 10 days. And to prevent further irregularity, it was determined that a year, ending a century, should not be a leap-year, with the exception of that ending each fourth century. Thus 1700 and 1800 have not been leap-years, nor will 1900 be so, but the year 2000 will be. That is, when a centesimal year is divisible by 400, without a remainder, it is a leap-year, and when there is a remainder, the year consists of 365 days only. In this manner, three days are retrenched in 400 years, because the lapse of 11 minutes and 14 seconds makes three days in about that period. All other years in the century divisible by 4, without a remainder, are likewise leap-years. The Bull which effected this change was issued February 24, 1582.

[1] I am indebted to Professors Nourse and Hall, of the United States Naval Observatory, Washington, D. C., for the exact length of the solar or tropical year, which is given, from the most reliable data, as 365.2422008 days = 365 d. 5 h. 48 min. 46.14912 sec. This varies a few seconds from previous calculations, affecting only the length of time when the difference will amount to a day.

The year of the calendar is thus made, as nearly as possible, to correspond with the true solar year, and future errors in chronology will be avoided, as the difference will not amount to much more than a day in 3342 years, or until A. D. 3667, counting from the Council of Nice.

The Catholic nations, in general, adopted the *style* ordained by their sovereign pontiff,[1] but the greater part of the Protestants, with the exception of a portion of the Netherlands, were then too much inflamed against Catholicism, in all its relations, to receive even a purely scientific improvement from such a source. The Lutherans of Germany, Switzerland, and the remaining parts of the Low Countries at length gave way in 1700, when it had become necessary to omit *eleven* instead of ten days, in consequence of their having made that year a leap-year.

It was not until 1751, and after great inconvenience had been experienced for nearly two centuries from the difference of reckoning, that an act was passed (24 Geo. II. c. 23, 1751) for equalizing the style in Great Britain, Ireland, and the Colonies with that used in other countries of Europe. It was then enacted that eleven nominal days should be omitted; the last day of *Old Style* being Wednesday the 2d, and the first of *New Style* (the next day) Thursday the 14th, instead of the 3d of September, 1752, and the legal year, which had previously been held to begin with the 25th of March, was made to begin on the 1st of January. The Gregorian regulation of dropping one day in every hundredth year, except the fourth hundred, was also included.

The alteration was for a long time opposed by the prejudices of individuals; and even now, in some instances, in England, the old style is so pertinaciously adhered to, that rents are made payable on the old quarter days, instead of the new.

Assuming the Calendar to have been correct at the time of the Council of Nice, the first centesimal year, A. D. 400, which occurred only seventy-five years later, should not have been made a leap-year, but as it was, the first excess of one day

[1] Chambers's Encyclopædia.

took place. The following table, omitting the centuries 800, 1200, and 1600, which were properly leap-years, will show the difference which must be allowed in the respective periods, for changing *Old Style* to *New Style*:—

From	March	1st,	A. D.	400	to	March	1st,	A. D.	500,	omit	1 day
"	"	"	"	500	to	"	"	"	600,	"	2 days
"	"	"	"	600	to	"	"	"	700,	"	3 "
"	"	"	"	700	to	"	"	"	900,	"	4 "
"	"	"	"	900	to	"	"	"	1000,	"	5 "
"	"	"	"	1000	to	"	"	"	1100,	"	6 "
"	"	"	"	1100	to	"	"	"	1300,	"	7 "
"	"	"	"	1300	to	"	"	"	1400,	"	8 "
"	"	"	"	1400	to	"	"	"	1500,	"	9 "
"	"	"	"	1500	to	"	"	"	1700,	"	10 "
"	"	"	"	1700	to	Sept.	2d,	"	1752,	"	11 "

The change of *eleven* days in the last century, required to reduce old style to new, has been the cause of many mistakes, made by thoughtless persons, who apply that difference to all past time. All events require a correction, respective of the *time* of their occurrence. For example: Columbus discovered America on Friday, the 12th day of October, 1492, O. S., by the New Style this event happened on Friday, October 21, 1492, a difference of *nine* days only being made, as will be observed by reference to the table. Again, William Penn "arrived before the town of New Castle, in Delaware," on Friday, October 27, 1682, O. S., which reduced to N. S. is Friday, November 6th, *ten* days being then the difference, and in the next century, to take a familiar example, Washington was born on Friday, the 11th of February, 1732, and, as all the world knows, we celebrate the anniversary of his birth on the 22d of February, in this case properly omitting *eleven* days, as required by the act of Parliament.

Russia,[1] and the countries following the communion of the

[1] As this article was being prepared, the following appeared in the papers of the day:—

Associated Press Despatch.

London, June 21, 1878.—According to a Warsaw letter, the Gregorian Calendar is likely to be adopted in Russia. The Council of State and the Ministers have, for some time, been using both the old and new styles.

Greek Church, are now the only ones which adhere to the Old Style, an adherence which renders it necessary, when a letter is thence addressed to a person in another country, that the date should be given thus: April $\frac{1}{13}$ or $\frac{\text{June } 27}{\text{July } 9}$, for it will be observed that the year 1800, not being a Gregorian leap-year, has interjected another (or twelfth) day between old and new style. Earlier examples of double-dating may be found in the "Documents relating to the Colonial History of New York," vol. III., thus $\frac{9}{19}$th of 9^{ber}, and $\frac{13th}{23d}$ 10^{ber}, 1665, etc. etc. The months September, October, November, and December, were frequently written 7^{ber}, 8^{ber}, 9^{ber}, and 10^{ber}, or in Roman numerals. Also in "Macaulay's History of England," in the foot-notes to Chapter IV., thus: Feb. 3 (13), April 18 (28), May 28 (June 7), 1685, etc. etc.

Calendar of the "Society of Friends."

The numerical designation of the months used by the Society of Friends did not originate with them. In the calendar of Julius Cæsar the months were not only named, but were also numbered, thus:—

1. March.	4. June.	7. September.	10. December.
2. April.	5. July.	8. October.	11. January.
3. May.	6. August.	9. November.	12. February.

We find in early records, long before the advent of the Society of Friends, that dates were frequently given, in which the number of the month only was used, in accordance with the above arrangement.[1]

[1] In the distribution of the days through the several months, Julius Cæsar adopted a simpler and more convenient arrangement than that which has since prevailed. He had ordered that the first, third, fifth, seventh, ninth, and eleventh months, that is March, May, July, September, November, and January should each have 31 days, and the other months 30, excepting the twelfth month, February, which in common years should have only 29, but every fourth year 30 days. This order was broken to gratify the vanity of Augustus, by giving the sixth month, bearing his name, as many days as July, which was named after the first Cæsar. A day was accordingly taken from February and given to August; and in order that three months

Soon after the arrival of William Penn in this country, numerous laws were enacted for the government of the Province. Among them was one relating to the days of the week, and the months of the year, which is here given *verbatim* from the original MS. document, in possession of "The Historical Society of Pennsylvania," and which is entitled:—

"The great Law or the Body of Lawes of the Province of Pennsylvania and Territories thereunto belonging Past at an Assembly held at Chester (alias upland) the 7th day of y^e^ 10th month, called December 1682."

The 35th section is as follows:—

"35. And Be it further enacted by the authority aforesaid that the dayes of the Week and y^e^ months of the year shall be called as in Scripture, & not by Heathen names (as are vulgarly used) as the first Second and third days of y^e^ Week and first second and third months of y^e^ year and beginning with y^e^ Day called Sunday and the month called March."[1]

At the time the English Government passed the act requiring a change from *old style* to new, it became necessary for the Society of Friends to take action on the subject, which they did in this manner:—

"Extracts from the Minutes of the Yearly Meeting held at Philadelphia for Pennsylvania & New Jersey from the 14th to the 18th day of the Seventh Month (inclusive), 1751.

"Began Business on the 17th, being the third day of the Week.

"Israel Pemberton, Caleb Cowpland, Ennion Williams, Daniel Smith, Ebenezer Hopkins, & Joseph Parker are appointed to adjust the Accounts, and report the state thereof to-morrow.

of 31 days each might not come together, September and November were reduced to 30 days, and 31 given to October and December.

[1] It would appear from this, as though the year was to have commenced on the 1st day of March, and it is so stated by Hazard, in a foot-note on page 57, vol. 1, of the "Minutes of the Provincial Council of Penna." That this was not the case, may be seen by reference to "Votes of the Assembly of Penna.," to the Journal of George Fox, founder of the Society of Friends, and to the writings of William Penn, where double-dating is always used until the 25th of March, the commencement of another year.

"On the 18th . . . . . .

"The Clerk is directed with the Extracts of the Minutes of this Meeting to send Copies of the written Epistle from the Yearly Meeting of London, this year, directed to the Quarterly & Monthly Meetings of Friends in general.

"Agreed, that Friends within the Compass of this Yearly Meeting should concur with the Minute of the Yearly Meeting in London concerning the Method of computing time as prescribed by a late Act of Parliament, which minute is as follows, Viz^{t}: —

"Agreed, that, as by the late Act of Parliament for regu-
"lating the Commencement of the Year, it is ordered, that
"the first day of the Eleventh Month next, shall be deemed
"the first day of the Year 1752, and that the month called
"January shall be successively accounted the first month of
"the Year, and not the Month called March, as heretofore
"hath been our Method of Computing.

"That from and after the time above mentioned, the Eleventh
"month called January, shall thenceforward be deemed &
"reckoned the First month of every year, & to be so styled
"in all the Records & Writings of Friends, instead of com-
"puting from the month called March, according to our pre-
"sent Practice: And Friends are recommended to go on with
"the Names of the following months numerically according
"to our Practice from the beginning, so that the Months may
"be called & written as follows, That named January to
"be called and written the first month, and February to be
"called and written the Second Month, & so on. All other
"Methods of computing or calling the months unavoidably
"leading into Contradiction.

"And Whereas for the more regular computation of Time
"the same Act directs, that in the Month now called Sep-
"tember, which will be in the year 1752 after the second day
"of the said month, Eleven nominal Days shall be omitted
"and that which would have been the third shall be reckoned
"& Esteemed the fourteenth day of the said month, & that
"which would otherwise have been the fourth day of the said
"month must be deemed the Fifteenth, & so on. It appears

"likewise necessary that Friends should conform themselves "to this direction and omitt the Eleven nominal days accord-"ingly."

"Business being Ended, The Meeting adjourned to Burlington on the 24th day of the Ninth Month in the next Year according to this new Method of Computing of Time, which will be on the Second First day of the Week, in the month by Law called September.

Extracted & Examined
by
ISR. PEMBERTON,
Junr Clk."

According to both the Julian and Gregorian calendars, January has always been January, but to change the eleventh month to the first, and the twelfth to the second is making "confusion worse confounded," particularly to genealogists who wish to reduce dates of births and deaths from old style to new.

It may be difficult for some persons to understand the last paragraph of the preceding "Extracts," how the 24th of the Ninth Month (September) could be the Second First day of the week (Sunday) occurring in the month. It must be remembered, that the last day of Old Style was Wednesday, the 2d, and the first day of New Style, the next day, Thursday, the 14th of September (or Ninth Month), the change only affecting the numerical order of the days of the month, the names of the days of the week continuing as though no alteration had been made; consequently the first Sunday (or First day of the week) in the month happened on the 17th, and the second on the 24th; the month, by the dropping of 11 days, consisting of 19 days only.

Ecclesiastical and Historical Year.

In England, as early as the 7th century, the year began on the 25th of December, or Christmas day, and this date was used by most persons until the 13th century. But in the 12th century, the Anglican Church required that their year should commence on the 25th of March (Annunciation, or Lady-Day). This rule was adopted by the Civilians in the 14th century,

and was adhered to until 1752. It was known as the Ecclesiastical, Legal, or Civil year. The 1st of January, however, had been considered as the beginning of the Historical year from the time of the Conquest, A. D. 1066, and in Scotland from A. D. 1600. This difference caused great practical inconvenience, and consequently double-dating was usually resorted to, for time between the 1st of January and the 25th of March, thus: February, or 12th mo. 6th $168\frac{4}{5}$, or 1684–5, as we often find in old records. This date in New Style would correspond to February, or 2d month, 16th, 1685, the lower or last figure representing the Historical year, according to our present mode of computation, commencing with the 1st of January; and the upper or first figure the Ecclesiastical or civil year, beginning with the 25th of March. Without this method of double-dating it would be difficult to know which year was intended, particularly for time between the 1st and 25th of March. There are instances, however, in which double-dating for the above months was not used; in such cases the year, as given, must be taken as commencing on the 1st of January. This system was adopted, occasionally, in each country earlier than the Gregorian or New Style.

In changing the days of the month from old style to new, add to them the figures 9, 10, 11, or as the case may be in the respective periods of the preceding table; always remembering that in the numerical arrangement of the months, the First month represented March, and so on, previous to the year 1752 in Great Britain and her colonies.[1]

It is, however, particularly recommended, that dates should not be changed, in any case, but that the letters O. S. be added, when necessary. This will relieve Historians, and others, from much perplexity, as they can make their own calculations.[2]

[1] For the date of change in other countries, see next number of the Magazine.

[2] A work entitled "Memorials of John Bartram and Humphrey Marshall," Philadelphia, 1849, furnishes a case in point. It is devoted almost exclusively to a correspondence between members of the Society of Friends, in the early part of the last century, who used the numerical method of dating,

Dominical Letters.

It is sometimes of the greatest importance that we should know on what day of the week a certain event took place (or may happen in the future), or, having the day of the week, what day of the month will correspond to it. Numerous intricate methods of calculation have been suggested at various times for solving this difficulty. The use of the following table will save all that trouble and waste of time, and a few minutes' attention will make any person perfectly familiar with it.

The first seven letters of the alphabet, A, B, C, D, E, F, G, have been employed by chronologists to designate the several days of the week, the first letter standing for the first day of January, and so on, and since one of these letters must necessarily stand opposite to Sunday, it is called the Dominical or Sunday letter. When January begins on Sunday, the dominical letter for that year is A, and, as the common year consists of 52 weeks and 1 day, the year must begin and end on the same day of the week; and the next year must begin on Monday, therefore Sunday will be the seventh day, and the letter G will be the dominical letter. The third year will begin on Tuesday, and, as Sunday falls on the sixth day, F will be the dominical letter. Hence it follows that the dominical letters will succeed each other in a retrograde order, viz., G, F, E, D, C, B, A, and if there was no leap-year, the same day of the week would, in the course of seven years, return to the same days of the month. But since a leap-year contains 52 weeks and 2 days, any leap-year beginning on Sunday will end on Monday, and the following year will begin on Tuesday, the first Sunday of which must fall on the sixth day of January, to which the dominical letter F corresponds, and not G, as in common years. As the leap-year returns

beginning the year with the 1st month, or March. The editor has changed this, by naming the first month January, and consequently has dated a greater part of the letters two months before they were written, and births and deaths two months before they occurred. This is certainly *a* new style, and not uncommon among our younger genealogists.

every fourth year, the regular succession of the dominical letter is interrupted. Its next recurrence can be found by dividing the year by 4 (see example below, with the dominical letter F; the lower figures representing the remainders), if there be no remainder, the interval to the next year will be 6 years; if 2 remain it will be 11 years; if 1 remain it will be 6 years, and if 3 remain the interval will be 5 years.

GF.	F.	F.	F.	GF.	F.	F.	F.
1844 + 6 =	1850 + 11 =	1861 + 6 =	1867 + 5 =	1872 + 6 =	1878 + 11 =	1889 + 6 =	1895 + 5
0	2	1	3	0	2	1	3

The cycle of recurrence is, therefore, 6, 11, 6, 5, except as modified by the centesimal years.

I have been thus explicit, as I cannot find that any writer has mentioned the above fact. They all appear to be unanimous in the statement, that the Solar Cycle, a period of 28 years, is the *only* time when the same days of the week will correspond to the same days of the month. Previous to the change of style in 1752, 28 years always elapsed between any two leap-years having the same dominical letters, but since that time the rule will answer only for the leap-years of each century separately.

Immediately above, or preceding every leap-year in the table, there is a blank space, and in a line with it, under the century, will be found the dominical letter that must be used for the months of January and February, and in a line with the year, the letter to be used for the remainder of the leap-year; thus 1876 has B and A, 1880 D and C, 1884 F and E, etc. This, with the explanation at the top of the table, should enable any one to prove its accuracy by comparison with almanacs, either in the old or new style, or with books and newspapers.[1]

The year 1752, on account of the change of style, had three dominical letters. E from Wednesday, January 1st, to Saturday, February 29th; D from Sunday, March 1st, to Wednesday, September 2d; and A from Thursday, September 14th (when New Style was adopted), to the close of the year.

[1] A table similar to this, but not so extended, appeared in the N. E. Historical and Genealogical Register, vol. xx. 1866. It was communicated by Isaac J. Greenwood, of New York.

Explanation.—Look for the Century, then to the right or left for the year, and in a line with the latter, directly under the Century, is the Dominical letter for the year.

Then in the Calendar, in the lower part of the table, find the day of the month, and in a line with it, under the given Dominical Letter, you have the day of the week; or *vice versa*.

CENTURIES.

OLD STYLE.	0	100	200	300	400	500	600
	700	800	900	1000	1100	1200	1300
	1400	1500	1600	1700			
NEW STYLE.	1700		1800		1900	2000	
	2100		2200		2300	2400	
	2500		2600		2700	2800	

YEARS.

OLD STYLE.	NEW STYLE.								
0	6		17	23	28	34		40	45
1	7	12	18		29	35		40	46
2		13	19	24	30			41	47
3	8	14		25	31	36		42	
	9	15	20	26		37		43	48
4	10		21	27	32	38			49
5	11	16	22		33	39		44	50

OLD STYLE.	NEW STYLE.									
51	56	62		73	79	84	90			
	57	63	68	74		85	91	96		
52	58		69	75	80	86		97		
53	59	64	70		81	87	92	98		
54		65	71	76	82		93	99		
55	60	66		77	83	88	94			
	61	67	72	78		89	95			

DOMINICAL LETTERS.

A	**B**	**C**	**D**	**E**	**F**	**G**
S	Sa.	Fr.	Th.	Wed.	Tu.	Mon.
Mon.	**S**	Sa.	Fr.	Th.	Wed.	Tu.
Tu.	Mon.	**S**	Sa.	Fr.	Th.	Wed.
Wed.	Tu.	Mon.	**S**	Sa.	Fr.	Th.
Th.	Wed.	Tu.	Mon.	**S**	Sa.	Fr.
Fr.	Th.	Wed.	Tu.	Mon.	**S**	Sa.
Sa.	Fr.	Th.	Wed.	Tu.	Mon.	**S**

MONTHS.

January 31. October 31.					February 28. March 31. November 30.				
1	8	15	22	29		5	12	19	26
2	9	16	23	30		6	13	20	27
3	10	17	24	31		7	14	21	28
4	11	18	25		1	8	15	22	29
5	12	19	26		2	9	16	23	30
6	13	20	27		3	10	17	24	31
7	14	21	28		4	11	18	25	

April 30.					May 31.					
	2	9	16	23	30	7	14	21	28	
	3	10	17	24	1	8	15	22	29	
	4	11	18	25	2	9	16	23	30	
	5	12	19	26	3	10	17	24	31	
	6	13	20	27	4	11	18	25		
	7	14	21	28	5	12	19	26		
1	8	15	22	29	6	13	20	27		

A	B	C	D	E	F	G
S	Sa.	Fr.	Th.	Wed	Tu.	Mon.
Mon.	**S**	Sa.	Fr.	Th.	Wed.	Tu.
Tu.	Mon.	**S**	Sa.	Fr.	Th.	Wed.
Wed.	Tu.	Mon.	**S**	Sa.	Fr.	Th.
Th.	Wed.	Tu.	Mon.	**S**	Sa.	Fr.
Fr	Th.	Wed.	Tu.	Mon.	**S**	Sa.
Sa.	Fr.	Th.	Wed.	Tu.	Mon.	**S**

MONTHS.

August 31.					September 30. December 31.					
	6	13	20	27	3	10	17	24	31	
	7	14	21	28	4	11	18	25		
1	8	15	22	29	5	12	19	26		
2	9	16	23	30	6	13	20	27		
3	10	17	24	31	7	14	21	28		
4	11	18	25	1	8	15	22	29		
5	12	19	26	2	9	16	23	30		

June 30.					July 31.					
	4	11	18	25	2	9	16	23	30	
	5	12	19	26	3	10	17	24	31	
	6	13	20	27	4	11	18	25		
	7	14	21	28	5	12	19	26		
1	8	15	22	29	6	13	20	27		
2	9	16	23	30	7	14	21	28		
3	10	17	24	1	8	15	22	29		

(To be continued.)

Changes of Style in the Calendar.

COMPUTATION OF TIME, AND CHANGES OF STYLE IN THE CALENDAR.

ADDRESSED TO STUDENTS OF HISTORY AND GENEALOGY.

BY SPENCER BONSALL.

(Concluded from Vol. II. page 394.)

In the preparation of this article it was necessary to consult a number of works of reference for the purpose of comparing the statements of the best authorities on the subject. Information of great importance, to the student of history, in fixing and verifying dates, was found scattered in the volumes consulted, and, for convenience of reference, the notes taken are now given in a more condensed form.

The "New Style," or Gregorian calendar, was adopted generally, in Roman Catholic countries, immediately after its promulgation, A. D. 1582. Most Protestant countries, however, continued for a longer or shorter period to use the "Old Style," or Julian calendar. It is necessary, therefore, in dealing critically with dates after 1582, to ascertain what "Style" was in use, at the time and place in question. The following table, compiled principally from "L'Art de vérifier les Dates," by M. de Saint-Allais, Paris, 1818, "The Chronology of History," by Sir Harris Nicolas, K.C.M.G., London, 1852, and "Handy-Book of Rules and Tables for Verifying Dates with the Christian Era," etc., by John J. Bond, Assistant Keeper of the Public Records, London, 1869, will serve to show when the chief States of Europe adopted the "New Style." As Mr. Bond had peculiar facilities for procuring correct information regarding the changes in many of the countries, and as his book is the latest authority to which I have had access, I have, when any doubt existed, preferred his dates to those of others.

	Old Style ended on—	New Style began next day—
In Spain,[1] Portugal, and the greater part of Italy, the same day as at Rome and Milan.	Thu. 4 Oct. 1582.	Fri. 15 Oct. 1582.
In France[2] and Lorraine.[3]	Sun. 9 Dec. 1582.	Mon. 20 Dec. 1582.
In Germany[4] and Switzerland[5] (by Roman Catholics). In Savoy.[6] In the Roman Catholic Netherlands,[7] *viz.*, Brabant, Limbourg, Luxembourg, Gelderland (in part)—*Duchies.* Flanders, Artois, Hainault, Namur—*Counties.* Antwerp (*called the Marquisate of the Holy Empire*). Malines—*Lordship.* In the Protestant Netherlands,[8] Holland and Zealand, *viz.*, Rotterdam, Amsterdam, Leyden, Delft, Haerlem, and the Hague.	Fri. 21 Dec. 1582.	Sat. 1 Jan. 1583.
In Prussia[9] (date of introduction not fixed).	.....	.... 1583.
In Poland.[10]	Tue. 21 Dec. 1585.	Wed. 1 Jan. 1586.
In Hungary[11] (date of introduction not fixed).	.....	.... 1587.
In Strasbourg.[12]	Sat. 18 Feb. 1682.	Sun. 1 Mar. 1682.
In Denmark,[13] and Protestant States of Germany.[14]	Sun. 18 Feb. 1700.	Mon. 1 Mar. 1700.
In Overyssel[15] or Overijsel (date not fixed).	.....	.... 1700.
In Gelderland[16] or Guelderland.	Wed. 19 June, 1700.	Thu. 1 July 1700.
In Utrecht.[17]	Tue. 19 Nov. 1700.	Wed. 1 Dec. 1700.
In Friesland[18] or Vriesland.	Fri. 20 Dec. 1700.	Sat. 1 Jan. 1701.
In Groningen,[19] and Protestant parts of Switzerland.[20]	Tue. 31 Dec. 1700.	Wed. 12 Jan. 1701.
In Tuscany[21] (date of introduction not fixed).	.....	..... 1751.
In Great Britain,[22] Ireland, and the Colonies.	Wed. 2 Sept. 1752.	Thu. 14 Sept. 1752.
In Sweden.[23]	Sun. 28 Feb. 1753.	Mon. 12 Mar. 1753.

[1] Spain, etc. Bull of Pope Gregory XIII., 24th Feb. 1582.

[2] France. Pursuant to edict of Henry III., dated 3d Nov. 1582.

[3] Lorraine. Orders of those who had the spiritual authority in the name of the Bishop, Charles de Lorraine, Nov. 24th, 1582. See *L'Art de vérifier les Dates.*

[4] Germany. [5] Switzerland. [6] Savoy. Authority not given. See *Bond's Handy-Book.*

[7] Roman Catholic Netherlands. Proclamation of the Court 22d December, 1582.

[8] Protestant Netherlands. By edict or *Plakaet* of 10 Dec. 1582 (entered in

YEARS, MONTHS, AND WEEKS.

YEAR (Mœso-Gothic, *jer;* Anglo-Saxon, *gear;* Dutch, *jarr;* Friesic, *jer;* German, *jahr;* Danish, *aar;* Swedish, *ar;* Ice-

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the *Great Plakaet boek*, I. 395, in the Record Office of the Hague), the introduction of the New Style was fixed for the 15th of December, 1582; but afterwards settled, by a resolution of the States of Holland, to begin on the 1st of January, 1583.

The other provinces only adopted the measure about the year 1700.

[9] Prussia. "State Papers.—Prussian, 1586."

[10] Poland. "State Papers, Cracow, 3 January, 1586, *Stylo novo.*"

[11] Hungary. The Diet of Presburg, held in the presence of the Archduke Ernest, 1587.

[12] Strasbourg. Through the exertions of M. de la Grange, intendant of Alsace, Feb. 5th, 1682. *L'Art de vérifier les Dates.*

[13] Denmark. "State Papers, Copenhagen, 2d May, 1702, S. N." (*Stylo novo.*)

[14] Protestant States of Germany. On the 15th Nov. 1699, the old Calendar was universally abandoned within the empire; and a new one, framed by a celebrated mathematician named Weigel, was adopted, which differed only from the Gregorian as to the mode of fixing Easter and the Movable Feasts, so that it sometimes happened that the Protestants and Catholics celebrated that feast on a different day.

[15] Overyssel (date of introduction not fixed). By resolution, dated 4 April, 1700.

[16] Gelderland. In accordance with a resolution of the States, dated 26 May, 1700. (*Geld. Plakaet boek*, III. 27.)

[17] Utrecht. By the resolution dated 24 July, 1700. (*Utrecht Plakaet boek*, I. 457.)

[18] Friesland. By resolution dated 11 and 12 October, 1700.

[19] Groningen. In consequence of a resolution of the States General, of 6 February, 1700.

[20] Protestant parts of Switzerland refused the New Style until 1700, when Weigel's Calendar was received by those of the cantons of Zurich, Berne, Basle, and Schaffhausen, who commenced the year 1701 on the 12th Jan. N. S.

[21] Tuscany. By the Emperor of Germany, as grand-duke of Tuscany. (Gentleman's Magazine, vol. xxi. p. 93.)

[22] Great Britain, &c. Pursuant to Statute 24 Geo. II. c. 23, 1751.

[23] By edict of the King 24th Feb. 1752. *L'Art de vérifier les Dates.*

Bond states, that "The Gregorian, or New Style, was adopted gradually after 1696. The King of Sweden, fearing that striking off ten days at once, might prove prejudicial to commercial transactions, adopted the New Style gradually, by making no Leap-year after 1696 until 1744, by which plan 11 days were dropped. The eleven intermediate '*fourth years*' having thus only 365 days each, made the year 1744 the same as other countries where the New Style had been adopted." According to this arrangement, New Style would have commenced on Tuesday, 1 March, 1740.

landic, *ar;* Sanscrit, *jahran*, a course, or circle, to move in a circle).

Year, in the full extent of the word, is a system, or cycle of several months, usually twelve. Some writers define it as a period or space of time, measured by the revolution of some celestial body in its orbit. Thus the time in which the fixed stars make a revolution is called the great year; and the times in which Jupiter, Saturn, the Sun, Moon, etc. complete their courses, and return to the same point of the zodiac, are respectively called the years of Jupiter, and Saturn, and the Solar and Lunar years, etc.[1]

It is stated in Hutton's "Philosophical and Mathematical Dictionary," that a year, originally, denoted a revolution, and was not limited to that of the sun. Accordingly, we find by the oldest accounts, that people have, at different times, expressed other revolutions by it, particularly that of the moon; and consequently, that the years of some accounts are to be reckoned only months, and sometimes periods of two, or three, or four months. This will assist us greatly in understanding the traditions that certain nations give of their own antiquity, and perhaps also of the great age of men. We read expressly in several of the old Greek writers, that the Egyptian year, at one period, was only a month; and we are also told that at other periods it was three months, or four months; and it is probable that the children of Israel followed the Egyptian mode of computing their years. The Egyptians boasted, nearly two thousand years ago, that they had historical records of events, happening forty-eight thousand years before that period. This statement was evidently intended to deceive the Greeks, with the design of making them believe that they, the Egyptians, were the most ancient nation, an ambition which the Chinese attempt, at present, to imitate, striving to impress us with the idea that they are the oldest people on the earth. Both the present and the early imposters have pretended to ancient observations of the heavenly bodies, and recounted eclipses, in particular, to vouch for the truth of their statements. Since the

[1] Ephraim Chambers's Cyclopædia, 1741.

time in which the solar year, or period of the earth's revolution round the sun, has been received, we may calculate with certainty; but, in regard to those remote ages, in which we do not precisely know what is meant by the term year, it is impossible to form any satisfactory conjecture of the duration of time, as computed by the ancients in their chronicles.

The Babylonians pretend to an antiquity of the same fabulous kind; they boast of forty-seven thousand years in which they had kept observations; but we may judge of these as of the others. The Egyptians speak of the stars having four times altered their courses in that period which they claim for their history, and that the sun set twice in the east. They were not such perfect astronomers but that, after a roundabout voyage, they might perhaps mistake the east for the west, when they came in again, particularly as the use of the mariner's compass was unknown to them.

The tropical or solar year, properly, and by way of eminence so-called, is the space of time in which the sun moves through the twelve signs of the zodiac. This, by observations of the best modern astronomers, contains 365 d. 5 h. 48 m. 46.14912 seconds. The quantity assumed by the authors of the Gregorian calendar was 365 d. 5 h. 49 m., which corresponds exactly with the observations of Bianchini, and de La Hire, in the next century. In the civil, or popular account, the year contains 365 days, with an additional day every four years.

The excess of the solar year over 365 days has been given by different astronomers as follows:—

Meton and Euctemon	5th	Century	B. C.	6 h. 18 m. 57	sec.
Hipparchus	2d	"	"	5 h. 55 m. 12	"
Sosigenes	1st	"	"	6 h. 0 m. 0	"
Albategnius	9th	"	A. D.	5 h. 46 m. 24	"
Alphonsine Tables	13th	"	"	5 h. 49 m. 16	"
Copernicus	16th	"	"	5 h. 49 m. 6	"
Tycho Brahe	"	"	"	5 h. 48 m. 45.5	"
Kepler	17th	"	"	5 h. 48 m. 57.65	"
Halley	"	"	"	5 h. 48 m. 54.691	"
Lalande	18th	"	"	5 h. 48 m. 35.5	"
Delambre	"	"	"	5 h. 48 m. 51.6	"
Laplace	"	"	"	5 h. 48 m. 49.7	"
Hind, 1850	19th	"	"	5 h. 48 m. 46.2	"

Month (Gothic, *menath;* Anglo-Saxon, *monath*, from *mona*, the moon; German, *monat;* Dutch, *maand;* Danish, *maaned;* Swedish, *manad*).

The next convenient division of time, which is marked out by the revolutions of the heavenly bodies, is the month. The *astronomical* month is the period of time in which the moon performs a complete revolution round the heavens, and is either *periodical* or *synodical*. The *periodical* month is the time in which the moon moves from one point of the heavens to the same point again, and is equal to 27 d. 7 h. 43 m. 47 seconds; and the *synodical* month, or *lunation*, as it is sometimes called, is that portion of time which elapses between two successive new moons, or between two successive conjunctions of the moon with the sun, and is equal to 29 d. 12 h. 44 m. 3.19 seconds. The *solar* month is that portion of time in which the sun moves through one entire sign of the zodiac, the mean quantity of which is 30 d. 10 h. 29 m. 3.84576 seconds, being the twelfth part of the solar year.

Week (Anglo-Saxon, *weoc;* Dutch, *week;* German *woche;* Danish, *uge;* Swedish, *vecka*).

The subdivision of the month into weeks is very ancient, and has been adopted by almost all nations, excepting the ancient Greeks, the inhabitants of the north of China, the Persians, and the Mexicans. It originated with the ancient Chaldeans, who gave the name of one of the seven planets to each hour of the day, and designated each day by the name of that planet which corresponded with the first hour of the day. In order to understand this, the order of the planets must be given upon the Ptolemaic system, that is, in the order of their distances from the earth, beginning with the most distant: Saturn, Jupiter, Mars, the Sun, Venus, Mercury, and the Moon. Commencing with Saturn, on the first hour of the first day, and allotting to each hour a planet, in the order named, the first hour of the second day, it is found, would fall to the Sun; of the third day, to the Moon; of the fourth, to Mars; of the fifth, to Mercury; of the sixth, to Jupiter; and of the seventh, to Venus.[1]

[1] Edinburgh Encyclopædia.

The Latins adopted these designations in their names of the days of the week. They are to be found in old law books and MSS., and are still used by the learned professions throughout Europe.

Occasionally, the *signs only* of the planets were used, for the sake of brevity, particularly in diaries and journals. This is notably the case in the original MS. field-book of Mason and Dixon's survey of the boundary line between Pennsylvania and Maryland, 1763 to 1768, in possession of the Historical Society of Pennsylvania. In this book the name of each day of the week is represented by the sign, in addition to the usual dates, for a period of over four years. See, also, "Minutes of the Provincial Council of Pennsylvania" (Colonial Records), vol. ii. pages 90 to 96, etc. etc. In the latter part of vol i. (same Records) the Latin names of the days were used.

Our Saxon ancestors, before their conversion to Christianity, named the seven days of the week from the sun and moon, and some of their deified heroes, to whom they were peculiarly consecrated, and representing the ancient gods or planets; which names we have received, and still retain.

Latin.	Signs.	English.	Anglo-Saxon.	Presided over by
Dies Saturni	♄	Saturday	Sætern-dæg	Saturn
Dies Solis	☉	Sunday	Sunnan-dæg	The Sun
Dies Lunæ	☽	Monday	Monan-dæg	The Moon
Dies Martis	♂	Tuesday	Tiwes-dæg	Mars
Dies Mercurii	☿	Wednesday	Wodnes-dæg	Mercury
Dies Jovis	♃	Thursday	Thors-dæg	Jupiter
Dies Veneris	♀	Friday	Frigas-dæg	Venus

In some ancient documents we find the equivalent terms, *Dies Sabbati* for Saturday, and *Dies Dominica* for Sunday. Tiw, Tyw, Tuisto or Tuesco, the Saxon Mars, or God of war. Woden or Odin, a Scandinavian chief or deity, the reputed author of magic, and the inventor of all the arts, and was thought to answer to the Mercury of the Greeks and Romans. Thor was the god of thunder, as well as the ancient Jove. Friga, Freya, or Freja was the Scandinavian Venus; she was the wife of Thor, and goddess of peace, fertility, and riches.

This order of the days, first adopted by the Chaldeans, was

preserved by the Mosaic law. The Christians, however, began their week on Sunday, and the Mahometans on Friday.

Calendar of the French Republic from 1792 to 1806.

Although Encyclopædias and other works mention the French Republican Calendar, and in some cases attempt to give copies of it, I have yet to find, in the English language, a correct exemplar, or one that can be used for practical purposes. The Calendar here given may be relied on for perfect accuracy in every particular, as it has been prepared directly from the "Almanach National de France," and the "Gazette Nationale, ou Le Moniteur Universel."

The zeal for innovation which accompanied the French revolution, induced the rulers to change their calendar along with their government. It was decreed by the National Convention, in the autumn of 1793, that the vulgar era should be abolished in all civil concerns; that the new French era should be reckoned from the foundation of the republic, September 22, 1792, of the vulgar era, on the day of the true autumnal equinox; that each year should begin on the midnight of the day on which the autumnal equinox falls; and that the first year of the French republic had begun immediately after 12 o'clock P. M. of the 21st of September, 1792, and had terminated on the midnight between the 21st and 22d of September, 1793. In order to effect a correspondence between the seasons and the civil year, it was decreed that the fourth year of the republic should be the first sextile, or leap year, that a sixth complementary day should be added to it, and that it should terminate the first *Franciade;* that the sextile, or leap year, should take place every four years, and should mark the close of each Franciade; that the first, second, and third centesimal years, viz. 100, 200, and 300 of the republic, should be common, and that the fourth, viz. 400, should be sextile; and this should be the case every four centuries until the fortieth, which should terminate with a common year.

It was intended that the year should have been divided into ten parts, conformably to the decimal system: but, in taking the divisions of the months, the twelve revolutions of

the moon round the earth made it absolutely necessary to admit twelve months. These were named after the seasons to which they belonged.

Autumn	Vendémiaire	Vintage month	September	22	to October	21	30 days
	Brumaire	Foggy month	October	22	" Nov.	20	30 "
	Frimaire	Frosty month	November	21	" Dec.	20	30 "
Winter	Nivôse	Snowy month	December	21	" Jan.	19	30 "
	Pluviôse	Rainy month	January	20	" Feb.	18	30 "
	Ventôse	Windy month	February	19	" March	20	30 "
Spring	Germinal	Germinating month	March	21	" April	19	30 "
	Floréal	Flowery month	April	20	" May	19	30 "
	Prairial	Meadow month	May	20	" June	18	30 "
Summer	Messidor	Harvest month	June	19	" July	18	30 "
	Thermidor	Hot month	July	19	" August	17	30 "
	Fructidor	Fruit month	August	18	" Sept.	16	30 "

As the French months consisted of 30 days each, making in all 360 days, the remaining five days required to complete the year were called *complementary days* and *sans-culottides*. They were named as follows:—

1. Primedi	Fête de la Vertu	The Virtues	Sept. 17th
2. Duodi	Fête du Génie	Genius	" 18th
3. Tridi	Fête du Travail	Labor	" 19th
4. Quartidi	Fête de l'Opinion	Opinion[1]	" 20th
5. Quintidi	Fête des Récompenses	Rewards	" 21st

The intercalary day of every fourth year was called *La sans-culottide*, and was to be the Festival of the Revolution, to be dedicated to a grand solemnity, in which the French should celebrate the period of their enfranchisement, and the institution of the Republic. The National oath, "To live free or die," was to be renewed.

Each day was divided according to the decimal system, into ten parts or hours, and these into ten others, and so on.

Each month was divided into three decades, each consist-

[1] "This festival, absolutely original, and perfectly adapted to the French character, was to be a sort of political carnival of twenty-four hours, during which people should be allowed to say or to write with impunity, whatever they pleased concerning every public man. It was for opinion to do justice upon opinion itself; and it behooved all magistrates to defend themselves by their virtues against the truths and the calumnies of that day."—Thiers' *History of the French Revolution.*

Roman Numerals.

In connection with this subject, it seems proper that some mention should be made of dates and numbers, such as are found in old books and MSS., and on ancient sculptures and monuments. The Roman numerals, with which we are all familiar, are I, V, X, L, C, D, and M. Some of the others are rather more difficult to understand.

When the Romans wrote several units, following each other, the first and last were longer than the rest, thus |IIII| In ancient MSS. four is written IIII, and not IV; nine thus VIIII, and not IX, etc. Instead of V, five units |III| were sometimes used in the eighth century. Half was expressed by an S at the end of the figures, CIIS was one hundred two and a half. This S sometimes appeared in the form of our 5. In some old MSS. the figures LXL are used to express ninety.

Q was sometimes used for 500, being the initial of Quingenti.

When Ↄ (a reversed C) is annexed to IↃ, it makes the value ten times greater, and in like manner, the annexing of Ↄ, and prefixing of C, increases its value tenfold. It has the power of the cipher 0 annexed to an Arabic numeral, and repeated.

Thousands were also expressed by a small line drawn over any numeral, thus $\overline{\text{I}}$ signifies 1000; $\overline{\text{VII}}$ 7000; $\overline{\text{LX}}$ 60,000; likewise $\overline{\text{M}}$ 1,000,000; $\overline{\text{MM}}$ 2,000,000, etc.

The Roman numerals were generally used in England, France, Italy, Germany, and Spain, from the earliest times, to the middle of the 15th century.

"The College accounts in the English universities were generally kept in the Roman numerals till the early part of the sixteenth century; nor in the parish registers were the Arabic characters adopted before the year 1600. The oldest date we have met with, in Scotland, is that of 1490, which occurs in the rent-roll of the diocese of St. Andrew's; the change from Roman to Arabic numerals occurring, with a corresponding alteration in the form of writing, near the end of the volume."[1]

[1] Encyclopædia Britannica.

"With respect to the dates of charters, the use of Roman ciphers was universal in all countries; but to avoid falling into error, it must be observed that in such dates, as well as those other muniments of France and Spain, the number for a thousand was sometimes omitted, the date beginning by hundreds; in others, the thousands were set down, and the hundreds left out; and in latter ages both thousands and hundreds were alike suppressed, and people began with the tens, as if —78 was put for 1778, a practice still followed in letters, and in affairs of trifling consequence.

"The numeral figures which have for some centuries prevailed in Europe are certainly Indian [East Indian]. The Arabians do not pretend to have been the inventors of them, but they ascribe their invention to the Indians, from whom they borrowed them. The numerals used by the Bramins, the Persians, the Arabians, and some other eastern nations are similar to each other, and the same characters were introduced into Europe, where they prevailed in the fifteenth century.

"The learned Dr. Wallis, of Oxford, delivers it as his opinion that the Indian or Arabic numerals were brought into Europe, together with other Arabic learning, about the middle of the tenth century, if not sooner."[1]

"The Saxon dates" on the table "are taken from the Danish and Norwegian registers, preserved in Suhm's Northern Collections.

"The oldest numerals are from a very curious Almanac, beautifully written on vellum, and belonging to the University of Edinburgh. It is calculated especially for the year 1492.

"Fac-similes from Caxton's *Mirrour of the World.* Shirwood's *Ludus Arithmomachiæ*, given in Dibdin's *Bibliotheca Spenceriana.*"[2]

[1] Astle's Origin and Progress of Writing—London, 1794.

[2] Encyclopædia Britannica.

ROMAN AND ARABIC NUMERALS.

AS FORMERLY USED.

I	1	XX or ⅩⅩ	20	C	100
IIII or IV	4	XXX or ⅩⅩⅩ	30	CCCC or CD	400
IIIII or V	5	XXXX or XL	40	D or Ↄ or Ɋ	500
IIIIII or VI	6	L	50	DC or Ↄc	600
IIX or VIII	8	LX	60	DCC or Ↄcc	700
IX or VIIII	9	L⅄ or LXX	70	M or Ⅿ or ⅯM or cIↃ or	
X	10	XXC or LXXX	80	ↀ or ∞ or ⅭↃ	1,000

∞Ↄ or IIIII or IV or XLↃↃ or CƆↃ or CCCCↃ 4,000
V or ƆↃ or IↃↃ or Ↄ or ↀ or ⅄ or V or IƵ 5,000
X or ↀ or ⅄ or ⅭↃ or ↀ or ccIↃↃ 10,000
XV or ↀ ↀ or ⅄ ⅄ or ccIↃↃIↃↃ 15,000
XX or ↀ ↀ or ↀ ↀ or ccIↃↃccIↃↃ 20,000
L or IↃↃↃ or IↃↃↃ or ƆↃↃ 50,000
C or ↀ or cccIↃↃↃ or cccIↃↃↃ 100,000
D or IↃↃↃↃ or ƆↃↃↃ 500,000
M or ccccIↃↃↃↃ 1,000,000

SAXON NUMERALS.

ı v x l c ð m Mccccxcvm īccc xxxiii Qx
1 5 10 50 100 500 1000 1398 1334 510

Progress of European Numerals.	*Variations of European Numerals.*	
1 2 3 ꝑ 4 6 ∧ 8 9 10 *Oldest MSS.*	1. ꟻ ꟻ ϒ ιι ι	6. ☞ ☞ ☞ ☞ ☞
1 2 3 4 ɥ 6 ∿ 8 9 10 *Caxton, 1480.*	2. ⅂ ℨ ℨ ℨ ⊳ ɾ z z z	7. ∧ ∧ ∧ ∧ ∧
1 2 3 ꝑ ɥ 6 ∧ 8 9 10 *Shirwood, 1482.*	3. ℨ ℨ ℨ ℨ ℨ ℨ	8. ȣ ȣ ȣ ȣ ȣ
1 2 3 4 ɥ 6 7 8 9 χ *Old French.*	4. ϰ ℓ ☾ ∝ ∞ ɑ ɥ ϰ	9. ϑ ϑ ϑ ϑ
1 2 3 4 5 6 7 8 9 1 ɣ *Old English.*	5. ɑ ɥ ꝑ ꝑ ꝑ ɥ ɥ ɥ ɥ	10. ☉ I ☉ Y ☉ 10

৭ ২ ৩ ৪ ৭ ৫ ৭ ৯ ০ *Sanscrit.* ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০ *Bengalee.* ١ ٢ ٣ ٤ ٥ ٦ ٧ ٨ ٩ ١٠ *Arabic.*

The above table is a compilation, from BOISSARD'S ROMAN ANTIQUITIES, the ENCYCLOPÆDIA BRITANNICA, and many other works, by Spencer Bonsall. ↀIↃↀↀↀL⅄IIX.

NOTES ON SUNDRY CALENDARS.

BY ALEXANDER WILCOCKS.

The very interesting article by Mr. Spencer Bonsall on "Changes of Style in the Calendar" in Nos. 8 and 9 of this Magazine rather piques the curiosity of students of history and genealogy as to the character of other calendars which have had, or may still have, existence.

On examining the fifty short chapters in which the subject of Calendars is treated by M. François Arago in his "Astronomie Populaire," one is rewarded by learning some valuable facts regarding them.

Perhaps the most interesting of the non-Christian Calendars described by him, because of its superior accuracy, was that of Persia.

The following is a translation of Mons. Arago's account of it as it appears in Chapter XIX. Book XXIII.

The Persian Year in the Eleventh Century.

The Persians had already adopted in the eleventh century an intercalation which brought their civil year very near to the astronomical one, and which maintained the equinoxes and the solstices upon the same days of the civil year.

It was thus constituted: Three ordinary years of 365 days were followed by a leap-year of 366 days, and this period of four years was repeated seven times. This was succeeded by a period in which the leap-year did not occur until after four ordinary years.

Let us ask what length of year ensues from this mode of intercalation? Here is the answer:—

The first seven periods form a total of 28 years, the eighth period comprises five years, making a total of 33 years.

Therefore, in 33 years the Persians intercalate 8 days.

Hence the fractional part of the year beyond the 365 days may be expressed thus, $\frac{8 \text{ days}}{33}$

$$\frac{8 \text{ days}}{33} = 0.2424 \text{ days.}$$

10,000 years with the Persian mode of intercalation comprise	3,652,424^{ds}
10,000 astronomical years comprise . .	3,652,422^{ds}.64
The difference is only	1^{dy}.36
Between the civil year as amended by Gregory XIII.[1] and the astronomical year there is a difference of	2^{ds}.36

Thus it appears that the Persian mode of intercalation is superior in accuracy to the Gregorian Calendar now adopted by the greater part of Europe, and of the New World.

In his "History of the French Revolution" M. Thiers describes the twelve months into which the year was divided by the Directory. He also tells us of the complementary days, and the "sans culotides;" but about the manner in which the "Republican year" was made to keep pace with the astronomical year he says absolutely nothing.

More strange still than the above is the fact that while M. Arago describes with minuteness so many different calendars, upon the above interesting point in the Republican Calendar he says as little as does M. Thiers.

Upon one point only he enlarges, and thereon bases the reflection, that as the exact day on which the autumnal equinox occurs was to be calculated upon the longitude of the meridian of Paris, the founders of the Republican Calendar might have been assured that national jealousy would certainly prevent the people of other countries from adopting it.

In the "Atlas Universel d'Histoire et de Géographie," par M. N. Bouillet, under the head of "Chronologie" may be found a short, but minute account of the Republican Calendar.

The following is a translation of the article:—

[1] *Astronomie Populaire*, vol. iv. p. 688.

Republican Era.

This era, the most recent of all, is also that which has lasted the shortest time. Established in France by a decree of the Convention on the 5th October, 1793, it had a retroactive commencement from the 22d Sept. 1792.

As precedently, the ordinary years were to contain 365 days, those which contained 366 days were to be called *sextiles* (and not *bisextiles*). The difference consisted solely in the mode of intercalation.

It was ordered that the year 3 should be sextile, that from this epoch each fourth year should be sextile until the year 15; after which a 366th day should not be added till the year 20.

This sequence was to be repeated until the years 48 and 53 of the era. Thereafter a cycle of 33 years should be conformed to, in which every fourth year a sixth day called *épagomène* (that is to say, intercalated) should be added, but in such a manner that after the seventh intercalation, no addition should be made to the complementary days until the fifth year, when the 8th intercalation was to be made.

Special decrees in the years 1793 and 1794 abolished this mode of intercalation, and ordered that the first day of the year should always be that of the autumnal equinox, which was to be ascertained each year by astronomical calculations.

The duration of the Republican era was only 13 years and 100 days. By a Senatus consultum of the 22d Fructidor in the year 13, the conservative senate abolished this institution, and the 10th Nivose of the year 14 was followed immediately by the 1st of January, 1806.

In the preparation of the article "Chronologie" in the "Atlas" from which the above is translated, the Collaborator of Mons. Bouillet was Mons. Caillet.

It will be observed that by the combined testimony of these two authorities, the mode of intercalation by which the Convention proposed to keep their civil year in coincidence with the astronomical year was absolutely identical with that adopted in Persia in the Eleventh Century.

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Another calendar described in detail by M. Arago is that of the Christian Church. All are familiar with the mode in which the time for the celebration of Easter was determined at the Council of Nice.

M. Arago mentions a fact with which most persons are unacquainted, viz., that "the paschal moon is a conventional moon; and may arrive at its full one or two days before or after the true or mean astronomical moon."

"Hence ensue frequent reclamations of the public, being unaware that the time of Easter is based upon the phases of a fictitious or imaginary moon, and not upon those of the real moon." "Astronomers are, therefore, taxed with ignorance or carelessness for causing the celebration of Easter to take place a month after the proper time."

There are other calendars and sundry eras described by M. Arago, which would repay perusal by those interested in such subjects.

The same is true of the subject of Chronology as treated in the "Atlas d'Histoire et de Géographie."

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